

## CLAIMS

1. A valve actuator assembly for an engine of a vehicle comprising:  
a movable engine valve;  
a movable roller finger follower operatively engaged with said engine  
valve;  
5 a rotatable cam;  
an intermediate finger follower operatively engaged with said roller finger  
follower and said cam; and  
at least one actuator operatively cooperating with said intermediate finger  
follower to position said intermediate finger follower in two directions relative to said  
10 cam to move said roller finger follower to position said engine valve at a desired lift and  
phasing.
2. A valve actuator assembly as set forth in claim 1 wherein said  
roller finger follower has one end in contact with one end of said engine valve.
3. A valve actuator assembly as set forth in claim 2 including a  
hydraulic lash adjuster pivotally connected to the other end of said roller finger follower.
4. A valve actuator assembly as set forth in claim 1 wherein said at  
least one actuator is pivotally connected to one end of said intermediate finger follower.
5. A valve actuator assembly as set forth in claim 1 wherein said at  
least one actuator moves said intermediate finger follower in at least one of a horizontal  
direction and a vertical direction.
6. A valve actuator assembly as set forth in claim 1 wherein said at  
least one actuator comprises a first actuator pivotally connected to said intermediate  
finger follower to move said intermediate finger follower in a horizontal direction and a

second actuator operatively cooperating with said first actuator to move said first actuator  
5 and said intermediate finger follower in a vertical direction.

7. A valve actuator assembly as set forth in claim 1 wherein said at  
least one actuator comprises a first actuator and a second actuator pivotally connected to  
said intermediate finger follower to move said intermediate finger follower in a  
horizontal direction and said first actuator operatively cooperating with said second  
5 actuator to move said second actuator and said intermediate finger follower in a vertical  
direction.

8. A valve actuator assembly as set forth in claim 1 wherein said  
intermediate finger follower is operatively engaged with said rotatable cam through a first  
roller, and said intermediate finger follower is operatively engaged with said movable  
roller finger follower through a second roller to affect movement of the engine valve.

9. A valve actuator assembly as set forth in claim 8 further  
comprising a stationary ramp which guides movement of said second roller, said ramp  
having a curved portion to control the vertical displacement of the second roller, thereby  
controlling valve seating.

10. A valve actuator assembly as set forth in claim 9, wherein said  
second roller is in continuous rolling contact with said stationary ramp, said intermediate  
finger follower, and said movable roller finger follower.

11. A valve actuator assembly as set forth in claim 9, wherein said  
second roller is spring-biased toward said intermediate finger follower.

12. A valve actuator assembly as set forth in claim 1 wherein said intermediate finger follower pivots about a first pivot point which is connected to said at least one actuator, and said roller finger follower pivots about a second pivot point.

13. A valve actuator assembly as set forth in claim 12 including a controller electrically connected to said at least one actuator to energize and de-energize said at least one actuator.

14. A valve actuator assembly comprising:

a movable engine valve;

5 a movable roller finger follower operatively engaged with said engine valve;

a rotatable cam;

10 an intermediate finger follower operatively engaged with said roller finger follower; and

a first actuator operatively connected to said intermediate finger follower to move said intermediate finger follower in either one of a horizontal direction and a vertical direction and a second actuator operatively cooperating with said first actuator to move said first actuator and said intermediate finger follower in the other one of a horizontal direction and a vertical direction to position said intermediate finger follower relative to said cam to move said roller finger follower to position said engine valve at a desired lift and phasing.

15. A valve actuator assembly as set forth in claim 14 wherein said roller finger follower has one end in contact with one end of said engine valve.

16. A valve actuator assembly as set forth in claim 15 including a lash adjuster pivotally connected to the other end of said roller finger follower.

17. A valve actuator assembly as set forth in claim 14 wherein either one of said first actuator and said second actuator is pivotally connected to one end of said intermediate finger follower.

18. A valve actuator assembly as set forth in claim 14 wherein said first actuator and said second actuator are of a linear type to generate linear motion.

19. A valve actuator assembly as set forth in claim 17 including a controller electrically connected to said first actuator and said second actuator to energize and de-energize said first actuator and said second actuator.

20. A valve actuator assembly as set forth in claim 14 including a housing having a chamber.

21. A valve actuator assembly as set forth in claim 18 including an engine valve spring disposed in said chamber to bias said engine valve toward a closed position.

22. A valve actuator assembly as set forth in claim 14 wherein said intermediate finger follower is operatively engaged with said rotatable cam through a first roller, and said intermediate finger follower is operatively engaged with said movable roller finger follower through a second roller to affect movement of the engine valve.

23. A valve actuator assembly as set forth in claim 22 further comprising a stationary ramp which guides movement of said second roller, said ramp having a curved portion to control the vertical displacement of the second roller, thereby controlling valve seating.

24. A valve actuator assembly as set forth in claim 23, wherein said second roller is in continuous rolling contact with said stationary ramp, said intermediate finger follower, and said movable roller finger follower.

25. A valve actuator assembly as set forth in claim 24, wherein said second roller is spring-biased toward said intermediate finger follower.

26. A valve actuator assembly as set forth in claim 23, wherein said stationary ramp is mounted to an engine block.

27. A method of operating a valve actuator assembly for a vehicle comprising:

- 5 providing a movable engine valve;
- providing a movable roller finger follower operatively engaged with the engine valve;
- 10 providing a cam and rotating the cam;
- providing an intermediate finger follower operatively engaged with the roller finger follower; and
- 15 actuating at least one actuator operatively cooperating with the intermediate finger follower in vertical and horizontal directions, positioning the intermediate finger follower relative to the cam, and positioning the engine valve at a desired lift and phasing.

28. A valve actuator assembly for an engine of a vehicle comprising:

- a movable engine valve;
- 5 a movable roller finger follower operatively engaged with said engine valve;

a rotatable cam;

10                    an intermediate finger follower operatively engaged with said cam through  
a first roller, and operatively engaged with said roller finger follower through a second  
roller, said second roller being guided by a stationary curved ramp; and

                    at least one actuator operatively cooperating with said intermediate finger  
15   follower to position said intermediate finger follower in two directions relative to said  
cam to move said roller finger follower to position said engine valve at a desired lift and  
phasing.